Preliminary Science Flight Report
Operation IceBridge Antarctica 2011

Flight: **F20**
Mission: **Crosson 1a**

Flight Report Summary

Aircraft	**DC-8 (N817NA)**
Flight Number	120124
Flight Request	128008
Date	Sunday, November 13, 2011 (Z), Day of Year 317
Purpose of Flight	Operation IceBridge Mission Crosson 1a
Take off time	12:51:54 Zulu from Punta Arenas (SCCI)
Landing time	23:56:42 Zulu at Punta Arenas (SCCI)
Flight Hours	11.2 hours
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• Low-altitude survey (1,500 ft AGL) of a grid over the Crosson Ice Shelf area including two ICESat orbits. Completed entire mission as planned, except for 10 nm because clouds obscured the terrain at Mt Murphy. • Collected additional high altitude data over sea ice in the Bellingshausen Sea on approach and on return. • ATM, MCoRDS, snow and Ku-band radars, gravimeter, and DMS were operated on the survey lines. • Conducted one ramp pass (1000 ft AGL) at Punta Arenas airport after takeoff for ATM and DMS instrument calibration.
Geographic Keywords	Crosson Ice Shelf, Smith Glacier, Bear Peninsula, Mt. Murphy, Antarctica
ICESat Tracks	ICESat: 0220, 0339
Repeat Mission	None.

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	☑	☒	☑	42 GB	None
MCoRDS	☑	☒	☒	1.3 TB	None
Snow Radar	☑	☒	☒	210 GB	None
Ku-band Radar	☑	☒	☒	210 GB	None
DMS	☑	☒	☑	67 GB	None
Gravimeter	☑	☑	☑	1.1 GB	None
DC-8 Onboard Data	☑	☑	☑	40 MB	None

Mission Report (Michael Studinger, Mission Scientist)

This is a new mission, based on the Crosson 1 mission drafted for the 2010 OIB fall campaign but not flown then. Its primary purpose is to map the bathymetry beneath the Crosson Ice Shelf on a 10-km grid using gravimetry, supplemented by all of the other OIB sensors. A secondary purpose is to map thinning of Smith Glacier using altimetry. The grid is designed around descending ICESat orbit tracks, utilizing two of them in place of the regularly-spaced 10-km grid lines. A tie line with the 2009 Thwaites Ice Shelf survey is included, and the grid also ties into the 2010 Dotson shelf survey. It also purposely flies over areas of exposed bedrock to better constrain the gravity inversion. The grid is designed to avoid the most difficult terrain around 8000' Mount Murphy.

The forecast and satellite images indicated some clouds around Mt Murphy. We were able to complete almost all lines except for one. We had to shorten one line at waypoint 033999 by 10 nautical miles because clouds were obscuring the terrain.

We collected high altitude data over sea ice on the way to the survey area and on the way back to Punta Arenas.

The only penguin colony in the area is on Bear Peninsula and we did an extra wide turn that kept us more than 6.5 nautical miles (12 km) away from the location of the colony.

Individual instrument reports from experimenters on board the aircraft:

ATM: Both systems worked well. 4.7 hours of science data collection.

MCoRDS: The MCoRDS system worked well.

Snow and Ku-band radar: The snow and Ku-band radars collected data along the entire line.

Gravimeter: Worked well. No issues.

DMS: DMS worked well.

DC-8 on board data: System worked well.

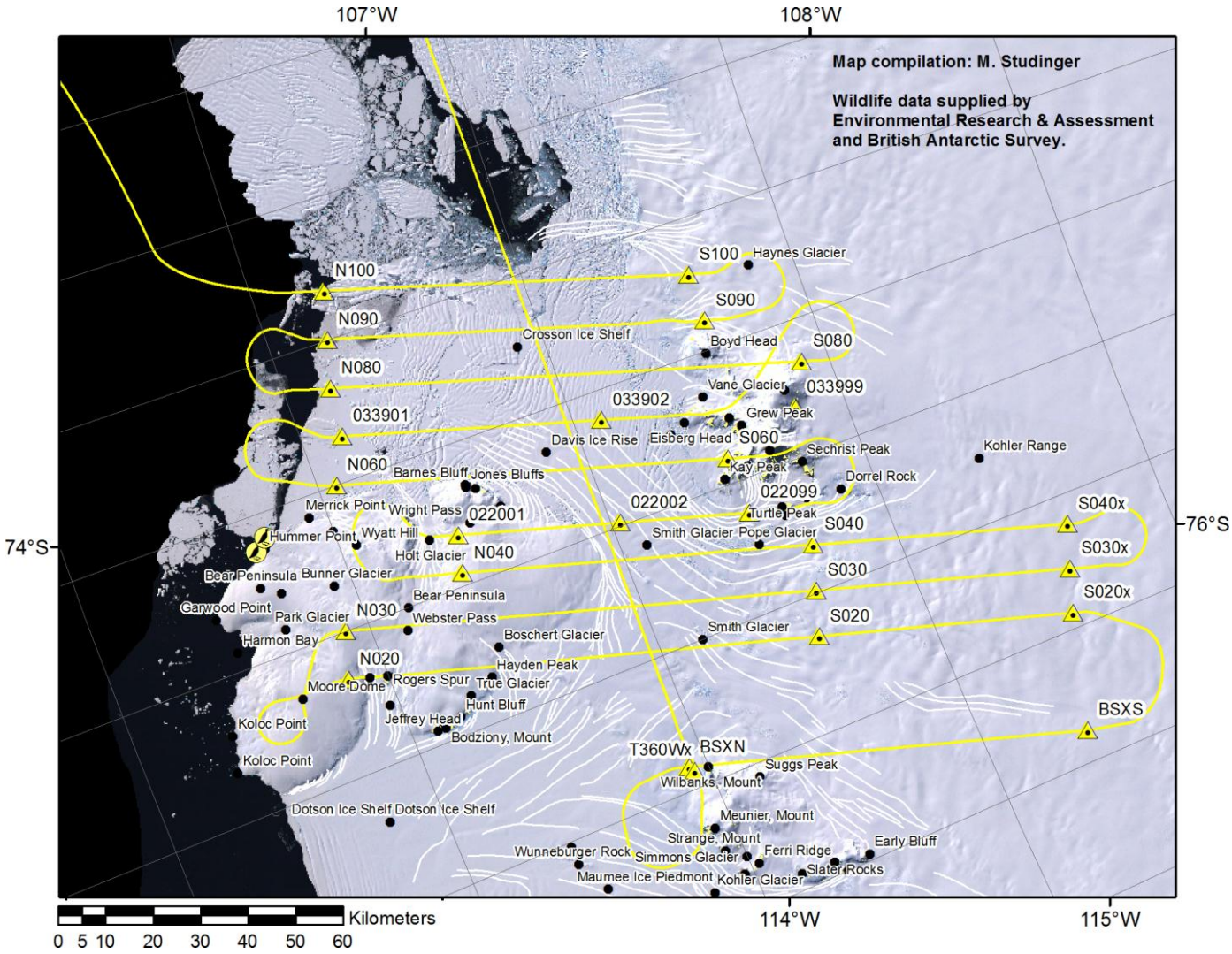

Figure 1: DC-8 trajectory over the Crosson Ice Shelf (yellow). Background image is LIMA mosaic.